AF232U Design of Timber-Based Hybrid Structures 7.5 credits

Design av träbaserade hybridkonstruktioner

This is a translation of the Swedish, legally binding, course syllabus.

Establishment

Course syllabus for AF232U valid from Spring 2018

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

The Built Environment

Specific prerequisites

150 credits (credits) including courses in building material, structural mechanics and structural engineering equivalent to a minimum of 22.5 credits or equivalent competence.

Documented skills in English B or the equivalent (TOEFL, IELTS e g).

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

On completion of the course, the student should:

- Understand the physical and mechanical behaviour of different wood species and wood-based materials.
- Have general knowledge of the physical and mechanical behaviour of some materials which can be used in combination with wood.
- Understand both possibilities and limitations of timber when used in structures.
- Understand, analyse and design wood-based hybrid components.
- Understand, analyse and design wood-based hybrid systems.
- Gain knowledge about connection techniques for timber-based hybrid members and structures.
- Be able to analyse and design timber-based hybrid components with partial and complete composite action.
- Be aware about possible failure modes of hybrid structures.

Course contents

The structure of wood and its properties

- Mechanical properties

- Physical properties

- Improved durability- Wood modification methods etc.

- Significant properties of some timber species (eg spruce, pine, beech birch)

Engineered wood products (EWP)

Mechanical and physical properties of certain construction materials

- Steel

- Concrete

- Glass

- Aluminium

Wood-based hybrid components and- system, an overview.

Mechanical connections, an overview

Adhesion and adhesives, an overview

Theory of full and partial interaction between different components.

- CLT

- Plywood

- Hybrid components (beams, columns, floors, trusses)

- Wood and metal

- Wood and glass

- Wood and concrete

- Long-term behaviour (creep)

- Shear and peeling stress

Hybrid system (halls, multi-storey buildings, bridges, etc.)

Architecture with timber-based hybrid structures.

Course literature

Illston, J. M. and Domone, P. L. J, (Oath.). Construction Material. Their Nature and Behaviour.

Spon PressPrint ISBN: 978-0-419-25860-5, eBook ISBN: 978-0-203-47898-1.

Scientific articles, reports and supplementary literature are available on Learning Management Systems, LMS, during course.

Examination

- PRO1 - Project work, 3.5 credits, grading scale: P, F
- ÖVN1 - Exercise, 1.0 credits, grading scale: P, F
- TEN1 - Written exam, 2.0 credits, grading scale: A, B, C, D, E, FX, F
- LAB1 - Lab work, 1.0 credits, grading scale: P, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

If the course is discontinued, students may request to be examined during the following two academic years.

Other requirements for final grade

Passed project assignment, exercises, laboratory part and written examination.

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.